LISTING OF CLAIMS

Claims 1-29 (original)

Claims 22-29 (canceled).

Claims 30-43 (new):

1. (original) Apparatus for detecting the thickness of layers of groundwater and any non-electrically conductive light or dense non-aqueous phase liquid (LNAPL or DNAPL), respectively, in a well comprising:

(a) an elongated sensor extending down the length of the well and having

(a-1) a conductive liquid sensing circuit, including a first resistive network of serially connected resistors, for sensing electrically conductive liquids only;

(a-2) a hydrostatic sensing circuit that responds to the actuation pressure of conductive and non-conductive liquids, said hydrostatic sensing circuit including a second resistive network of serially connected resistors;

(b) electrically conductive liquid measuring means, electrically coupled to said first resistive network, for producing a conductive liquid signal proportional to the thickness of a layer of conductive liquid in said well; and

(c) electrically conductive and non-conductive liquid measuring means, coupled to said second resistive network, for producing an all liquids signal proportional to the thickness of all liquids in said well including both conductive and non-conductive liquids.

2. (original) The apparatus of claim 1 including DNAPL measuring means coupled to a lower portion of said first resistive network at a well bottom portion for detecting the possible presence of an DNAPL layer adjacent said well bottom portion.

3. (original) The apparatus of claim 2 wherein said DNAPL measuring means includes means for measuring the resistance of said first resistive

network which is proportional to the thickness of said DNAPL layer adjacent said well bottom portion.

4. (original) The apparatus of claim 1 including LNAPL measuring means coupled to an upper portion of said second resistive network at a well top portion for detecting the possible presence of an LNAPL layer adjacent said well top portion.

5. (original) The apparatus of claim 4 wherein said LNAPL measuring means includes means for comparing the resistance of said first resistive network
with the resistance of said second resistive network.

6. (original) The apparatus of claim 3 including LNAPL measuring means coupled to an upper portion of said second resistive network at a well top portion for detecting the possible presence of an LNAPL layer adjacent said well top portion.

7. (original) The apparatus of claim 6 wherein said LNAPL measuring means includes means for comparing the resistance of said first resistive network
with the resistance of said second resistive network.

8. (original) Apparatus of claim 1 wherein said elongated sensor includes a well depth sensing circuit, including a third resistive network of serially connected resistors and well depth measuring means coupled to said third resistive circuit for producing a signal proportional to well depth.

9. (original) Apparatus of claim 2 wherein said elongated sensor includes a well depth sensing circuit, including a third resistive network of serially connected resistors and well depth measuring means coupled to said third resistive circuit for producing a signal proportional to well depth.

10. (original) Apparatus of claim 3 wherein said elongated sensor includes a well depth sensing circuit, including a third resistive network of serially connected resistors and well depth measuring means coupled to said third resistive circuit for producing a signal proportional to well depth.

11. (original) Apparatus of claim 4 wherein said elongated sensor includes a well depth sensing circuit, including a third resistive network of serially connected resistors and well depth measuring means coupled to said third resistive circuit for producing a signal proportional to well depth.

12. (original) Apparatus of claim 1 wherein said elongated sensor comprises a tape coupled to tape support means extending along the length of the well for retaining said tape in place within said well between well inspections thereby eliminating lowering sensors into said well that may require subsequent decontamination procedures.

13. (original) Apparatus of claim 2 wherein said elongated sensor comprises a tape coupled to tape support means extending along the length of the well for retaining said tape in place within said well between well inspections thereby eliminating lowering sensors into said well that may require subsequent decontamination procedures.

14. (original) Apparatus of claim 3 wherein said elongated sensor comprises a tape coupled to tape support means extending along the length of the well for retaining said tape in place within said well between well inspections thereby eliminating lowering sensors into said well that may require subsequent decontamination procedures.

15. (original) Apparatus of claim 4 wherein said elongated sensor comprises a tape coupled to tape support means extending along the length of the well for retaining said tape in place within said well between well inspections thereby eliminating lowering sensors into said well that may require subsequent decontamination procedures.

16. (original) Apparatus of claim 1 wherein said conductive liquid sensing circuit includes a conductive liquid sensing means is coupled to each resistor of said first resistive network for effectively removing a resistor from said first resistive network should a conductive liquid contact said conductive liquid sensing means.

17. (original) Apparatus of claim 2 wherein said conductive liquid sensing circuit includes a conductive liquid sensing means is coupled to each resistor of said first resistive network for effectively removing a resistor from said first resistive network should a conductive liquid contact said conductive liquid sensing means.

18. (original) Apparatus of claim 3 wherein said conductive liquid sensing circuit includes a conductive liquid sensing means is coupled to each resistor of said first resistive network for effectively removing a resistor from said first resistive network should a conductive liquid contact said conductive liquid sensing means.

19. (original) Apparatus of claim 4 wherein said conductive liquid sensing circuit includes a conductive liquid sensing means is coupled to each resistor of said first resistive network for effectively removing a resistor from said first resistive network should a conductive liquid contact said conductive liquid sensing means.

20. (original) Apparatus of claim 5 wherein a conductive liquid sensing means is coupled to each resistor of said first resistive network for effectively removing a resistor from said first resistive network should a conductive liquid contact said conductive liquid sensing means.

21. (original) Apparatus of claim 12 wherein each conductive liquid sensing means includes an associated tiny conductive contact positioned within said tape, thereby enabling very precise liquid level measurements.

Claims 22-29 (canceled)

30. (new) The apparatus of claim 8 including water column measuring means for subtracting measured resistance of said first resistive network from measured resistance of said third resistive network for producing a water column height signal.

31. (new) The apparatus of claim 9 including water column measuring means for subtracting measured resistance of said first resistive network from measured resistance of said third resistive network for producing a water column height signal.

32. (new) The apparatus of claim 10 including water column measuring means for subtracting measured resistance of said first resistive network from measured resistance of said third resistive network for producing a water column height signal.

33. (new) The apparatus of claim 11 including water column measuring means for subtracting measured resistance of said first resistive network from measured resistance of said third resistive network for producing a water column height signal.

34. (new) Apparatus for detecting the thickness of layers of water and any non-electrically conductive light or dense non-aqueous phase liquid (LNAPL or DNAPL), respectively, in a well comprising:

(a) a first elongated sensor comprising a conductive liquid sensing circuit, including a first resistive network of serially connected resistors, for sensing electrically conductive liquids only;

(b) a second elongated sensor comprising a hydrostatic liquid sensing circuit that responds to the actuation pressure of both conductive and non-conductive liquids, said hydrostatic sensing circuit including a second resistive network of serially connected resistors; and

(c) a third resistive network for producing a resistance proportional to the length of said first elongated sensor.

35. (new) The apparatus of claim 34 including means for subtracting the measured resistance of said second resistive network from the measured resistance of said first resistive network for producing a signal indicating the depth of any LNPL present.

36. (new) The apparatus of claim 34 including means for measuring the resistance of said first resistive network from the bottom of said well for indicating the thickness of any DNPL layer that may be present.

37. (new) The apparatus of claim 35 including means for measuring the resistance of said first resistive network from the bottom of said well for indicating the thickness of any DNPL layer that may be present.

38. (new) The apparatus of claim 34 including water column height measuring means for subtracting measured resistance of said first resistive network from measured resistance of said third resistive network for producing a water column height signal.

39. (new) The apparatus of claim 35 including water column height measuring means for subtracting measured resistance of said first resistive network from measured resistance of said third resistive network for producing a water column height signal.

40. (new) The apparatus of claim 36 including water column height measuring means for subtracting measured resistance of said first resistive network from measured resistance of said third resistive network for producing a water column height signal.

41. (new) The apparatus of claim 37 including water column height measuring means for subtracting measured resistance of said first resistive network from measured resistance of said third resistive network for producing a water column height signal.

42. (new) The apparatus of claim 34 wherein said first elongated sensor, said second elongated sensor and said third resistive network are permanently situated within said well, thereby to eliminate possible cross contamination between wells.

43. (new) Apparatus for detecting the thickness of layers of water and any non-electrically conductive light or dense non-aqueous phase liquid (LNAPL or DNAPL), respectively, in a well comprising:

(a) a first elongated sensor comprising a conductive liquid sensing circuit, including a first resistive network of serially connected resistors, for sensing electrically conductive liquids only;

(b) a second elongated sensor comprising a hydrostatic liquid sensing circuit that responds to the actuation pressure of both conductive and non-conductive liquids, said hydrostatic sensing circuit including a second resistive network of serially connected resistors;

(c) a third resistive network for producing a resistance proportional to the length of said first elongated sensor;

(d) first measuring means for subtracting the measured resistance of said second resistive network from the measured resistance of said first resistive network for producing a signal indicating the depth of any LNPL that may be present;

(e) second measuring means for measuring the resistance of said first resistive network from the bottom of said well for indicating the thickness of any DNPL layer that may be present;

(f) third measuring means for subtracting measured resistance of said first resistive network from measured resistance of said third resistive network for producing a water column height signal; and

(g) support means for maintaining said first and second elongated sensors stationary within said well during measurements carried out by said first, second, and third measuring means.